347
LGL-3-9
1500

(Not for Publication)

December 1965

EVALUATION OF DOUGLAS-FIR TUSSOCK MOTH INFESTATIONS IN NORTHERN IDAHO AND NORTHWESTERN MONTANA

1965

By
Scott Tunnock

U.S. DEPARTMENT OF AGRICULTURE - FOREST SERVICE
Division of State and Private Forestry
Forest Pest Control Branch
Region 1

Missoula, Montana

5230

EVALUATION OF DOUGLAS-FIR TUSSOCK MOTH INFESTATIONS IN NORTHERN IDAHO AND NORTHWESTERN MONTANA

1965

By
Scott Tunnock
Division of State and Private Forestry
Forest Pest Control Branch

SUMMARY

Douglas-fir tussock moths caused various degrees of defoliation during 1965 in 50 acres south of Polson, Montana; in three 10- to 40-acre areas south of Elmo, Montana; and within 225,000 acres in Benewah and Latah Counties, Idaho. These infestations were examined during October 1965 to determine the ratio of current egg masses to old and to evaluate the effects of natural mortality factors. No current egg masses were found in Montana and only a few were collected in Idaho. Observations showed that the infestations had died out. Factors responsible for this were nuclear polyhedrosis virus, parasites, and aerial applications of DDT in Idaho. Very little, if any, defoliation is expected in 1966.

INTRODUCTION

Areas defoliated by Douglas-fir tussock moths were detected during aerial surveys and examined for egg masses in October 1965 by Scott Tunnock, Division of State and Private Forestry. Damage occurred on lands owned by the St. Joe National Forest, Idaho; State of Idaho; Indian Reservations; Potlatch Forests, Inc.; Diamond National; and private individuals.

The history of this moth shows that it has been an economic pest in the Northern Region since 1927. Outbreaks seem to be cyclic and have occurred at 4- to 6-year intervals.1/ Aerial sprays of DDT were used to combat tussock moths in 1947 when they infested about 500,000 acres in northeastern Oregon, eastern Washington, and northern Idaho. Recent trouble started in 1961 when their feeding became apparent near private homes and in farm woodlots within Moscow, Clark Fork, and Bonners Ferry, Idaho. By 1963, forested areas were defoliated southwest of Kalispell, Montana, and north of Moscow, Idaho. Severe damage developed during 1964 on 70,000 acres in Benewah and Latah Counties, Idaho, and egg masses were found in about 300,000 acres. Also in 1964, the number of acres defoliated near Kalispell, Montana, increased to 4,800 and 250 acres were infested south of Polson, Montana. Many smaller, isolated infestations terminated by the fall of 1964.1/

1/ Tunnock, S., Status and trends of Douglas-fir tussock moth infestations in northern Idaho and northwestern Montana. Unpublished report filed at Div. State and Private Forestry, U.S. For. Serv., Missoula, Montana, 1964.

TECHNICAL INFORMATION

Causal agent.--Douglas-fir tussock moth, Hemerocampa pseudotsugata, McD.

Hosts.--Douglas-fir, Pseudotsuga menziesii var. glauca (Beissn.) Franco; grand fir, Abies grandis (Dougl.) Lindl.; subalpine fir, Abies lasiocarpa (Hook.) Nutt.; and Engelmann spruce, Picea engelmannii, Parry.

Type of damage.--Douglas-fir tussock moth larvae consume both current and previous year's foliage. Many trees are killed after one season's defoliation. Typically, one-third to one-half of a tree's crown is killed the first season. The remainder of the foliage may or may not be eaten the next year. If the following year's buds are not damaged, tree crowns often put out more needles and can recover. Data was collected for 5 years after an infestation on the Stanislaus National Forest, California. At the end of this period, 20 percent of the sawtimber volume died in white fir stands that were heavily defoliated. Mortality was caused by defoliation alone, and by a combination of defoliation and attacks by cambium-mining beetles. Heart rot fungi entering through dead tops probably added to the loss.2/

Location, intensity, or size of outbreak.--In Benewah and Latah Counties, from Troy north to Plummer, Idaho, 225,000 acres suffered various degrees of defoliation (fig. 1). All the host trees previously mentioned were attacked, but damage was more prevalent on Douglas-fir and grand fir trees. The hosts were mixed with red cedar, white, ponderosa, and lodgepole pines, hemlock, and larch. Damage was usually heaviest along ridge tops, because the wind disperses first instar tussock moths and they land more often on high spots.

Only about 50 of the 250 acres of pure Douglas-fir infested in 1964 south of Polson, Montana, were defoliated in 1965. Three 10- to 40-acre areas of Douglas-fir mixed with ponderosa pine were lightly defoliated south of Elmo, Montana (fig. 1).

Biological data.--The above infested areas were visited in order to collect data which would be used to predict infestation trends for 1966. Egg masses are the main unit used for this; as an epidemic increases, new egg masses greatly outnumber old ones.

No current egg masses or cocoons could be found in the Polson or Elmo, Montana, infestations. This indicates that larvae died before spinning cocoons.

2/ Wickman, Boyd E., Mortality and growth reduction of white fir following defoliation by the Douglas-fir tussock moth. U.S. For. Serv. Res. Paper, PSW-7, Berkeley, California, 1963.

Hardly any current egg masses or cocoons were collected from the Idaho infestation. Seven were found under a board beneath a grand fir tree south of Potlatch. A large scale search by personnel of the St. Joe National Forest and cooperators from State and private agencies only produced a few current egg masses northwest of Moscow Mountain and one mass from Malory Creek.

Aerial sprays of DDT, nuclear polyhedrosis virus, and Dipterous and Hymenopterous parasites were responsible for terminating this outbreak. By August 13, virus killed 64 percent of 125 larvae collected on July 29 near Moscow. A Tachinid fly, Carcelia yalensis Sellers, was very abundant all season and probably parasitized many larvae. Five species of parasitic wasps were also abundant. One species has been tentatively identified as belonging to the genus Eulimneris. About 120,000 acres were treated in June with three-quarters of a pound of DDT in diesel oil at the rate of 1 gallon per acre. This control was almost 100 percent effective.

Environmental factors.--This season, the spring and summer months were cold and wet. Larval emergence from the overwintering eggs was delayed. Many egg masses did not hatch until after most 1965 needles were consumed by earlier emergers. First instars have a difficult time surviving without tender new growth to eat. Delayed development also gave adult parasites more time to lay eggs in or on the exposed tussock moth larvae.

DISCUSSION

The lack of 1965 egg masses in Idaho and Montana indicates that defoliation, if any, will be minor in 1966. There may be some isolated areas in Benewah and Latah Counties, Idaho, that could produce noticeable damage, but these populations would probably disappear by fall.

No control measures are recommended for 1966. Aerial surveys will be made of the areas mentioned during August 1966. Any infestations that are detected will be evaluated in October.

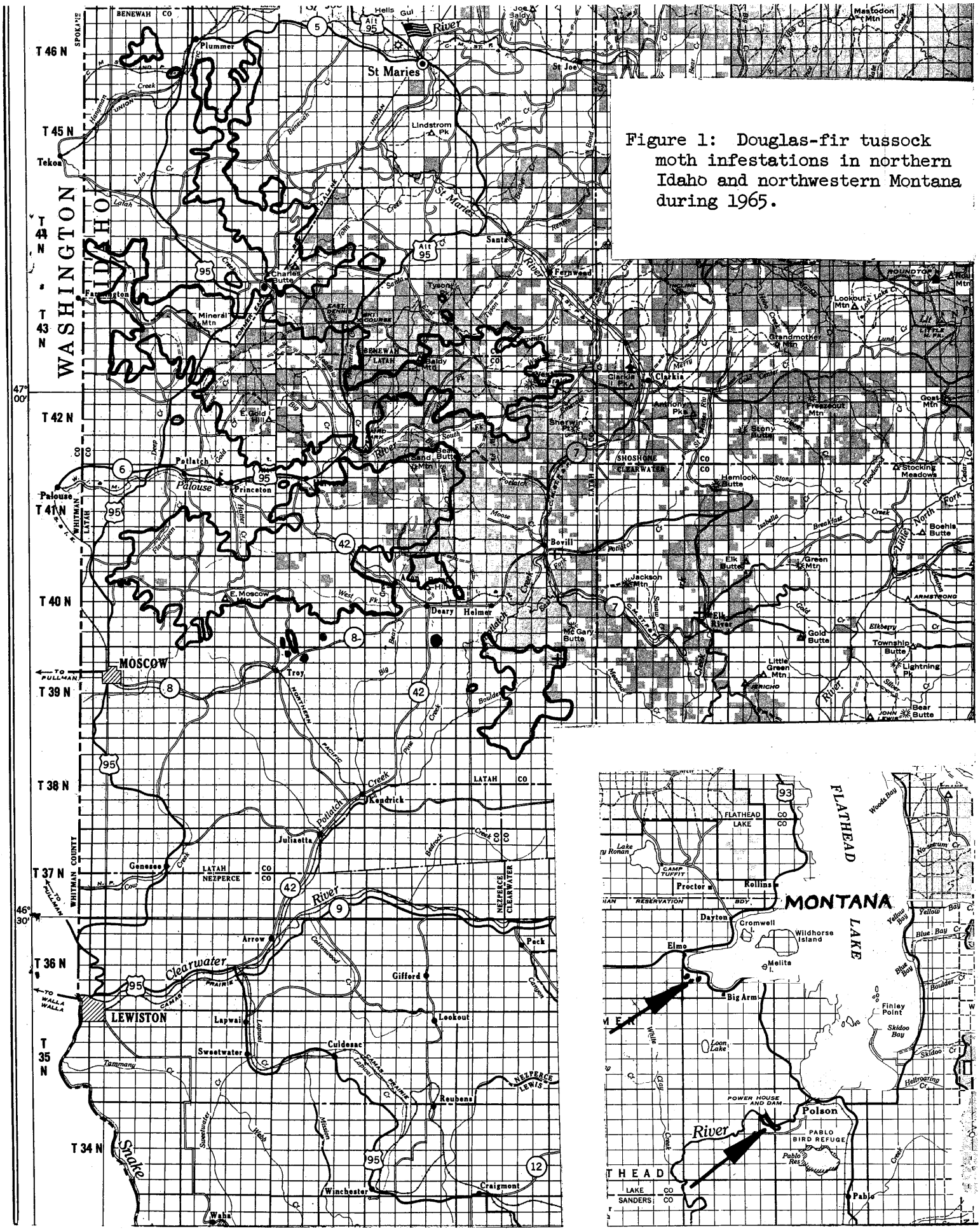

Figure 1: Douglas-fir tussock moth infestations in northern Idaho and northwestern Montana during 1965.